THE GENUS CONDALIA (RHAMNACEAE) IN VENEZUELA: C.HENRIQUEZII AND C.BUXIFOLIA.

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Summary: Condalia, first reported for Venezuela in 1980, has two species native there, and first collected scientifically there in 1939 and 1970 respectively. New observations are given on their distributions, habitats, morphologies, phenologies and uses.

Rodríguez-Carrasquero (1980) states that this genus had not been collected in Venezuela before the two collections by me of C.henriquezii in 1978 which he identified and cites. In fact, this species was collected from the same site by Francisco Tamayo as long ago as January 1939, as I mentioned in the letter I sent with the specimens to MO in 1978; and at least 4 other collections of it from nearby were made before mine, though identified later than mine.

Tamayo's collection is not mentioned in his account (1941) of his collecting trip, but it is cited, wrongly, as Bumelia celastrina (Sapotaceae) by Pittier in Pittier et al.(1947:283). His specimen at VEN had been annotated (in sequence) only as B.affinis (a syn. of B.celastrina), Castela (Simaroubaceae), and 'cf.Flacourtiaceae', when I found it there and annotated it as C.henriquezii (genus new for the herbarium) in 1978. Since then, several other collections of the genus from nearby in Venezuela have appeared in the herbaria of VEN and Coro, as listed below. (I could not find at VEN the other 2 collections of B.celastrina cited in Pittier et al., viz. Curran & Haman 534 & 802, of 1917; they may well be correctly identified, as that species does grow at the Falcón site mentioned.) Also, the 'Erythroxylon sp.'(Erythroxylaceae) of Lasser & Vareschi (1957)'s study of Tamayo's site, the Coro dunes, is really C.henriquezii (Lasser 2728).

Both of the Venezuelan Condalia spp., when lacking flowers (which are inconspicuous) or fruits, as is often the case, are rather readily confusable with B.celastrina, which grows nearby but differs in being glabrous (except occasionally on extremely young shoots), with non-retuse non-mucronate leaves, and flat (not grooved) petioles, or with Castela erecta, which sometimes grows with C.henriquezii but differs in the leaves having a conspicuously downcurved margin and a conspicuously pale (densely pubescent) undersurface. I agree with Rodríguez-C. that C.henriquezii is probably native to the dry parts of NW. Venezuela (and not introduced from Curacao or Bonaire), but in this case its apparent absence from Aruba, the Paraguaná peninsula and the area west of Coro is puzzling. Both may well occur elsewhere in Venezuela and outside it, overlooked because of their vegetative resemblance to Bumelia and Castela, and their extreme spininess which (together with a tendency for leaves, flowers and fruits to fall off during processing) makes the preparation of good specimens a little difficult.

The vernacular name for both of the Condalia spp. in Falcón is 'caimito', the same name as is used there (both near Coro and on the Paraguaná peninsula) for Bumelia celastrina and B.obtusifolia, which genus likewise has edible black drupes. However, people who know both genera by the same vernacular name do not confuse them. On the south slope of the Serranía San Luis, where C.buxifolia and B.obtusifolia sometimes grow together, the former is sometimes called 'caimito negro' and the latter 'caimito blanco'.

The story of the discovery in Venezuela of this genus has a moral, which needs emphasising, namely that it is still very premature for tropical countries to try to be independent in taxonomic botany, and still very necessary to send specimens out of the country for identification. E.g. Venezuela's two main botanical libraries, at VEN (Caracas) and MY(Maracay) both seem to lack Boldingh (1914)'s Flora of Curacao, Aruba and Bonaire, in which C.henriquezii was first scientifically named, and their herbaria seem to contain almost no specimens from these very nearby but Dutch islands. This species, common only 1.7 km from the historic centre of Venezuela's second oldest town and first described from an island only 64 km from Venezuela, was collected by a Venezuelan and then lay unidentified in Venezuela's main herbarium for 39 years until recollected by a foreigner and sent to a foreign institution, where identified by a Venezuelan. Though xenophobia may at times be locally fashionable, cooperation with appropriate foreign institutions and individuals is in general much more useful. (Incidentally, the locality of my first collections is about 110 km from the nearest point of Curacaco, i.e. 68 miles, not 20 miles as stated by Rodríguez.) The following observations are based on my experience of Venezuelan material.

1. C.henriquezii Boldingh (1914, p.61, plate 7).

Distribution: Previously known to science only from Curacao & Bonaire, this is frequent and locally common on more or less loose sand in the dune area N. of Coro, and on firm soil on dry shrub-covered hill slopes and tops eastwards from Coro for at least 62 km. The furthest north record so far for Venezuela (and the furthest west for the world) is 31 km NNW. of Coro (near the N.end of the Paraguaná isthmus, c.50m ESE of the water-pumping station Isiro II; W8741; the isthmus is only 1 km wide if the bare periodically-flooded salt-flat area is disregarded). The furthest east record for Venezuela is the promontory of Sabanas Altas (W8142). The furthest south record for the world is 1.7 km NNW of Coro cathedral (W5322).

Habitat: It ranges from ½ to 300m above sea level (W7600), in dry mostly-thorny bushland, in sunlight or moderate shade, exposed to a dense population of ± free-ranging goats and donkeys (to which it is clearly resistant), on a variety of well-drained soils, including sand-dunes (near their base), practically bare limestone, firm somewhat sandy reddish-brown soil, and even alluvial clay on river-bank top. The annual rainfall of its area is probably c.370-500mm.

Description: It is a much-branched evergreen shrub (0.2-)0.4-3(-4) m tall, with trunk to 25cm (sic) diameter at base, and with spine-tipped twigs; leaves alternate, leaf-blades obovate, c.8-14 x 6-8 mm, mucronate (rarely not), apex rounded (to slightly retuse), base

cuneate, petiole 1-2mm long, leaf-margin entire; but (a new observation, like many others here) the juvenile foliage of young plants in shade has (1-)2-3(-4) conspicuous teeth on the distal half of each side (W10215, see fig.). Pedicels 1-2(-2½)mm long in flower (to 3mm rarely in fruit). Flowers 5mm across, green (slightly yellowish), with filaments pale green, anthers pale orange-brown, ovary green; disc yellowish green at anthesis, becoming orange-brown then red-brown, and finally almost black in old flowers. (Boldingh does not mention flower-colour. Johnston 1962 states sepals pale purplish olive, disk & ovary dark purple. Arnoldo 1964 states flowers greenish.) Ripe fruit a black drupe (with purple finger-staining juice), wider than long, 5x7 to 7x10 mm, widest at the base, with an apical dimple. Unripe fruit (seen very much more commonly than ripe fruit) is longer than wide, ellipsoid to almost spherical, c.5x4 to 6x5mm, passing from green through yellowish (with a network of darker green veins visible through the surface), becoming red from base upwards; (it is often eaten by animals while the distal half is still yellow-green). The Venezuelan material matches well a specimen I collected on Curacao with green ± mature flower-buds and green young to very young fruits (W7005, Rif, 24.8.79, Coro herbarium; this specimen has stems and leaves less hairy, and petiole-hairs shorter (c.0.1-0.15mm) than in much Venezuelan material - trivial inconstant overlapping differences certainly not worth taxonomic recognition at any level).

Phenology: It probably flowers and fruits rather irregularly throughout the year, depending on the rainfall pattern which can vary considerably from year to year and place to place, and perhaps (as a native affirmed) fruits heavily some weeks after heavy rain. So far, I've seen flowers in all months except January, green fruits in all but April, ± red fruits from at least July to March, and ripe fruits in July and August. (The only mention by Boldingh, Arnoldo or Johnston of flowering or fruiting time is that Johnston 1962 states it flowers in March.)

Use: The plant is conspicuous only when in full fruit, when it can be quite showy, its branches heavily laden with the black near-spherical juicy sweet-tasting drupes, which fall readily when the branches are knocked. Birds and people (especially children) eat the fruit fresh; people sometimes collect the fruit by placing a sheet on the ground under the bush and then beating the branches. The fruits are sometimes made into a drink, and could be cooked or preserved. They seem not sold, nor the plant cultivated, probably because the fruits are neither tasty enough nor plentiful enough. The fruit juice is said to have been used as ink, and to stain shoes etc., but seems not very suitable for this, the stain washing off the hands fairly easily when fresh (though not from paper when left to dry). The leaves, very young shoots and ripe fruits are frequently eaten by goats, acc. to V.Vargas of IUTAG who studies what goats eat.

Collections seen from Venezuela (all from Falcón State), in order of collection; (CORO is the herbarium of Proyecto Flora Falcón at IUTAG; f = with flowers, tj = with unripe fruit; s = sterile):
F.Tamayo 703, arbusto armado de los médanos de las inmediaciones de Coro, Jan.1939 (tj; VEN).

T.Lasser 2728, dunas de Coro, 28.12.50, frutos rojos o color vino tinto;(VEN).
E.Walter s.n.(herbarium no.77144,VEN), médanos, Paraguaná, 25.2.68 (f; probably same site as the 2 previous colls., just N.of Coro).
T.Ruiz y Equipo de Ecología 1297, Qda.Manglar, 10km W.of Puerto Cumarebo, 27km ENE of Coro, 150m, tree 3m, 12.4.77(s; CORO).
T.Ruiz y Eq.Ec.1503, mouth of Qda.Sta Juana, 5km W.of Pto.Cumarebo, 10m, 31.5.77(f; CORO).
Wingfield 5322, 1.7km NNW of Coro cathedral, 19.4.78(f; CORO,U,MO).
" 5322A, same loc., 27.9.78(f,tj; MO,K; a duplicate given to VEN in 10.78 seems not yet incorporated).
T.Ruiz & F.Tamayo 3509, Istmo de Paraguaná near Animas de Guasare, 1.8.78(f,tj; CORO,K,?MY).
Burandt & Wingfield 574, dunes N.of Coro, 6.4.79(f; UCOB).
Wingfield & López-Figueiras 7606, 7km SW.of Pto.Cumarebo, top of the ridge near the cross of La Soledad, on ± bare limestone, 300m, 11.3.80 (s; CORO).
Wingfield 8142, Sabanas Altas, 27km E of Pto.Cumarebo, 21.2.81(s;CORO).
" 8741, Istmo de Paraguaná, 31km NNW of Coro, 25.2.81(s; CORO).
" 10218, 2km N.of Guaibacoa, 22km ENE of Coro, 200m, ridge-top in mainly decid.bushland on red-brown soil; to 4m tall; 11.11.82 (f,tj; CORO).
" 10215, National Park médanos de Coro, bank of river Coro 1 km N. of bridge; on alluvial clay on top of river-bank in shade of Prosopis forest; with juvenile foliage; 18.12.82(s; CORO).

2. C.buxifolia Reissek 1861; fig.Flora Brasiliensis 11(1) t.28.
This species, hitherto known only from S.Brazil and N.Argentina, is now known also from Falcón & Lara States of NW.Venezuela, about 3800km NNW. Venezuelan material was identified by F.G.Davies of Kew (W.&Sm.6941; by comparison with specimens from Brazil), and fits well the description in Johnston 1962 and the drawing in Flora Brasiliensis. This remarkably disjunct distribution is not unique among Falcón's native plants. E.g. Mimosa hexandra of Paraguay, S.Brazil & N.Argentina is now also known from N.Falcón at 10-200m in natural dry deciduous bushland(specimens collected & det.by Lourdes Cárdenas, me & others). And Capparis 'magnifica' Ule (nomen) of Amazonian Brazil & Peru is also in the rainforest of E.Falcón at 150-1000m, where it extends over an area at least 69km long (specimens collected by Ruiz-Terán & me, one det. by H.Iltis).
C.buxifolia in Venezuela is so far known only from near Barquisimeto (Lara) and from the Serranía de San Luis (Falcón). At the latter site, it has a ± continuous population (and is locally common) on the western, drier, rain-shadowed part of the Serranía (from N. to S.slope across the ridge top), from at least 11 km W.of Carrizalito, through La Ciénega, Carrizalito and La Tabla to 5km NE of Carrizalito (along the road to Cerro Galicia) and S. to Maripiota (5 km SSW of Carrizalito), thus ranging at least 15 km east to west and 8km north to south.
Habitat: In Venezuela it is so far known from 580 to 1250m altitude on dry sometimes stony or rocky well-drained hill slopes and tops in semi-deciduous bushland and woodland, often over limestone, some-

times on ± bare limestone, but sometimes on possibly acid soils e.g. over sandstone. Its habitat is considerably higher and with higher rainfall (probably c.600-1000mm annually) than that of C.henriquezii, though seemingly less wet than in Brazil where, acc.to Johnston 1972, it is a hygrophyte of very moist soils principally in gallery forest. It is frequent in ± natural short open cloud-forest on the ± bare limestone ridgetop 3km W.of Carrizalito at 1200-1250m (with other rare native spp. known in Falcón only from this site (or in some cases very nearby also), e.g. Echeveria bicolor, Mentzelia aff.scabra, Senecio cobrensis, Zanthoxylum ciliatum), but also thrives in the considerably disturbed ± secondary bushland (shifting cultivation, goats & cattle) which now occupies most of its area.

Description: It differs from C.henriquezii in having the leaves longer (usually) and relatively narrower, to 36x13mm (incl.petiole; not to 17x11mm), over (not under) twice as long as wide, conspicuously retuse (to occasionally obtuse; not obtuse to occasionally slightly retuse), drying darker green or darker brown with the secondary nerves usually less conspicuous, the terciary nerves forming a network of ± isodiametric areolae (not elongated areolae ± at right angles to midrib); petioles 1-5mm long (not 1-1½mm); twigs dark somewhat purplish brown (not pale brown,unless obscured by microlichen); hairs on young twigs, petioles and extreme base of leaf-blade c.0.1mm long (not c. 0.15 - 0.2mm), those on leaf-blade-base being on upper surface only (not on the lower surface only, with sometimes a few along base of midrib on upper surface); pedicels 2-4mm long (to 8mm in fruit; not 1-2(-2½mm; to 3mm rarely in fruit); immature fruit more elongated, c.6x4 to 8.7 x 6mm (not 5x4 to 6x5mm), with longer style (sometimes persisting; c.0.6(-0.8)mm, not 0.3-0.5mm), and passing from green to black via dull brown-red-mauve (not via yellowish-green with darker veins, then red); ripe fruit ellipsoid, longer than wide (occasionally as long as wide), c.6½-8 x 6-7mm, persisting & shrivelling on the plant (not 5-7 x 7-10mm, wider than long, widest near base, readily falling), its flesh much thinner & less sweet. Also, the plant grows slightly larger, 1.2 -4(-6)m tall, trunk to 30cm wide at base; this could be a climatic rather than genetic difference. The flowers are yellowish green, ovary green, anthers cream, filaments becoming whitish.

Phenology: It may well flower and fruit irregularly and intermittently throughout the year, like C.henriquezii, as the populations do not seem well synchronised in this respect. The records so far are: Lara: flowers and unripe fruit July-Sept.; Falcón: fls.Jan.-March,July, Oct.- Nov. ; unripe fruits Sept-March,May-July; ripe fruits Feb.-March, Oct.-Nov.

Use: The cut branches are used to make dead fences against livestock; and the fresh fruits are eaten, mainly by children.

Collections seen from Venezuela, in order of collection:

(a) Lara State:

Steyermark 103267B, Dto.Palavecino, 700-1000m, dry chaparral slopes, NW-facing above Capudare on road to Terepaima, 10.8.70(VEN,US).

R.F.Smith V7791, Barquisimeto, vía Terepaima, 900m, 18.7.85(f,tj;VEN).

Wingfield & R.F.Smith 6941, 7km N.of Barquisimeto, 580m, hillside on alluvial soil with stones, 4.9.79 (f,tj; CORO,K).

(b) Falcón State (Sierra San Luis; all at CORO):
Wingfield 10197, common on limestone ½-2½km W.of Carrizalito (near the cave), 1050-1200m, 9.12.82 (tj).
" 10242, Carrizalito, ridge-top by road, 1170m, 24.12.82 (tj).
" 10354, La Tabla-Cerro Galicia, scattered from 950-1100m, on limestone & sandstone, to 4(4½)m tall, 28.1.83 (f,tj).
" 10477, 1 km SW of Carrizalito, 1.2-6m tall, 8.2.83(tj,ripe fruit).
" 10500, ½km E.of Maripiota, 3km SO.of La Peña, 580m, 12.10.83 (s).

No intermediates have been seen so far between the two species in morphology, locality, habitat or altitude; they seem good distinct species. Both are in cultivation at the Botanic Garden of Maracaibo, Venezuela; it would be interesting to see if they can be hybridized.

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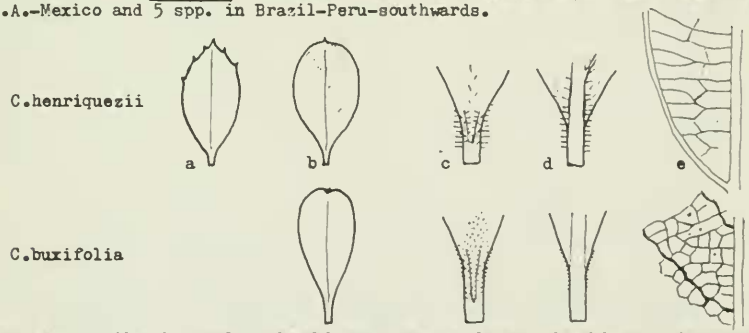
Map: Distribution of Condalia in the world as far as yet known, apart from 12 spp. in U.S.A.-Mexico and 5 spp. in Brazil-Peru-southwards.



Leaves: a, juvenile; b, usual; c, leaf-base upper-surface; d, leaf-base under-surface, e, venation of leaf undersurface.